



#5

SEQUENCE LISTING

<110> Murphy, Brian R.
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Skiadopoulos, Mario H.
Tao, Tao

<120> USE OF RECOMBINANT PARAINFLUENZA VIRUSES (PIVs) AS
VECTORS TO PROTECT AGAINST INFECTION AND DISEASE CAUSED
BY PIV AND OTHER HUMAN PATHOGENS

<130> 15280-404100US

<140> 90/733,692

<141> 2000-12-08

<150> 60/170,195

<151> 1999-12-10

<160> 62

<170> PatentIn Ver. 2.1

<210> 1

<211> 42

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Sequence of
pFLC.PIV32CT, 15474 bp in sense orientation.

<400> 1

cttaagaata tacaaataag aaaaacttag gattaaagag cg

42

<210> 2

<211> 36

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Flanking
sequence of Measles HA gene insert for N-P and P-M
junctions

<400> 2
gatccaacaa agaaacgaca ccgaacaaac cttaag

36

<210> 3
<211> 101
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Flanking
sequence of Measles HA gene insert for HN-L
junction

<400> 3
aggcctaaaa gggaaatata aaaaacttag gagtaaagtt acgcaatcca actctactca 60
tataattgag gaaggaccca atagacaaat ccaaattcga g 101

<210> 4
<211> 79
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Flanking
sequence of Measles HA gene insert for HN-L
junction

<400> 4
tcataattaa ccataatatg catcaatcta tctataatac aagtatatga taagtaatca 60
gcaatcagac aataggcct 79

<210> 5
<211> 64
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Cloning site
for GU insertion

<400> 5
aggaaaaggg aaatataaaa aacttaggag taaagttacg cgtgttaact tcgaagagct 60
ccct 64

<210> 6
<211> 38
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Cloning site
for NCR insertion

<400> 6
aggaaaaggg aacgcgtgtt aacttcgaag agctccct 38

<210> 7
<211> 63
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Cloning site
for supernumerary gene insert between the P and M
genes of rHPIV3

<400> 7
ttaacaatat acaaataaga aaaacttagg attaaagagc catggcgtac gaagcttacg 60
cgt 63

<210> 8
<211> 12
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: PIV3 gene end
(GE) sequence

<400> 8
aagtaagaaa aa 12

<210> 9
<211> 58
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Cloning site

for RSV G and F gene inserts in B/H PIV3

<400> 9
aggattaaag aactttaccg aaaggtaagg ggaaagaaat cctaagagct tagcgatg 58

<210> 10
<211> 11
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Flanking
sequence for RSV G gene insert in B/H PIV3

<400> 10
gcttagcgat g 11

<210> 11
<211> 15
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Flanking
sequence of RSV G and F gene inserts in B/H PIV3

<400> 11
aagctagcgc ttagc 15

<210> 12
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Flanking
sequence for RSV F gene insert in B/H PIV3

<400> 12
gcttagcaaa aagctagcac aatg 24

<210> 13
<211> 83
<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Forward primer
for PCR of measles HA gene insert for N-P and P-M
junctions

<400> 13

ttaatcttaa gaatatacaa ataagaaaaa cttaggatta aagagcgatg tcaccacaac 60
gagaccggat aaatgccttc tac 83

<210> 14

<211> 67

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Reverse primer
for PCR of measles HA gene insert for N-P and P-M
junctions

<400> 14

attattgctt aaggtttgtt cgggtgcggt tctttgttgg atcctatctg cgattgggtc 60
catcttc 67

<210> 15

<211> 55

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Forward primer
for PCR of measles HA gene insert for HN-L
junction

<400> 15

gacaataggc ctaaaaggga aatataaaaa acttaggagt aaagttacgc aatcc 55

<210> 16

<211> 68

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence:

Reverse/Forward primer for PCR of measles HA gene
insert for HN-L junction

<400> 16
gtagaacgcg tttatccggt ctcggttggtg tgacatctcg aatttggatt tgtctattgg 60
gtccttcc 68

<210> 17
<211> 28
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Reverse primer
for PCR of measles HA gene insert for HN-L
junction

<400> 17
ccatgtaatt gaatccccca acactagc 28

<210> 18
<211> 28
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:
Forward/Reverse primer for PCR of measles HA gene
insert for HN-L junction

<400> 18
cggataaacg cgttctacaa agataacc 28

<210> 19
<211> 23
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Upstream HPIV2
HN primer

<400> 19
gggccatgga agattacagc aat 23

<210> 20
 <211> 25
 <212> DNA
 <213> Artificial Sequence

 <220>
 <223> Description of Artificial Sequence: Downstream
 HPIV2 HN primer

 <400> 20
 caataagctt aaagcattag ttccc 25

 <210> 21
 <211> 31
 <212> DNA
 <213> Artificial Sequence

 <220>
 <223> Description of Artificial Sequence: Upstream HPIV2
 HN primer

 <400> 21
 gcgatggggcc cgaggaagga cccaatagac a 31

 <210> 22
 <211> 30
 <212> DNA
 <213> Artificial Sequence

 <220>
 <223> Description of Artificial Sequence: Downstream
 HPIV2 HN primer

 <400> 22
 cccgggtcct gatttcccga gcacgctttg 30

 <210> 23
 <211> 26
 <212> DNA
 <213> Artificial Sequence

 <220>
 <223> Description of Artificial Sequence: HPIV1 HN
 primer

<400> 23
agtggctaatt tgcattgcat ccacat

26

<210> 24
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: HPIV1 HN
primer

<400> 24
gccgtctgca tggatgaatag caat

24

<210> 25
<211> 13
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Oligomer
insert for rule-of-six conformity

<400> 25
cgcggcaggc ctg

13

<210> 26
<211> 14
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Oligomer
insert for rule-of-six conformity

<400> 26
cgcggcaggc cctg

14

<210> 27
<211> 15
<212> DNA
<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Oligomer
insert for rule-of-six conformity

<400> 27

cgcgaggcct ccgcg

15

<210> 28

<211> 16

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Oligomer
insert for rule-of-six conformity

<400> 28

cgcgccgcgg aggcct

16

<210> 29

<211> 17

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Oligomer
insert for rule-of-six conformity

<400> 29

cgcgcccgcg gaggcct

17

<210> 30

<211> 42

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Forward primer
for RSV A G gene insert

<400> 30

aattcgctta gcgatgtcca aaaacaagga ccaacgcacc gc

42

<210> 31
<211> 92
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Reverse primer
for RSV A G gene insert

<400> 31
aaaaagctaa gcgctagcct ttaatcctaa gttttttctta cttttttttac tactggcgtg 60
gtgtgttggtgaggatgaa ggttgatgatg gg 92

<210> 32
<211> 65
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Forward primer
for RSV A F gene insert

<400> 32
aaaggcctgc ttagcaaaaa gctagcaciaa tggagttgct aatcctcaaa gcaaagcaa 60
ttacc 65

<210> 33
<211> 89
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Reverse primer
for RSV A G gene insert

<400> 33
aaaagctaag cgctagcttc tttaatccta agttttttctt acttttatta gttactaaat 60
gcaatattat ttataccact cagttgatc 89

<210> 34
<211> 44
<212> DNA
<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Mutagenic
forward primer for modification of rHPiV3-1 cDNA

<400> 34
cggccgtgac gcgtctccgc accggtgtat taagccgaag caaa 44

<210> 35
<211> 59
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Mutagenic
reverse primer for modification of rHPiV3-1 cDNA

<400> 35
cccagacacg ctttgctcct aagtttttta tatttcccggt acgtctattg tctgattgc 59

<210> 36
<211> 95
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Forward primer
for insertion of HPiV2 F ORF into rB/HPiV3 genome

<400> 36
aaaatatagc ggccgcaagt aagaaaaact taggattaaa ggccgatgga tcacctgcat 60
ccaatgatag tatgcatttt tggtatgtac actgg 95

<210> 37
<211> 72
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Reverse primer
for insertion of HPiV2 F ORF into rB/HPiV3 genome

<400> 37
aaaatatagc ggccgctttt actaagatat cccatatatg tttccatgat tgttcttgga 60
aaagacggca gg 72

<210> 38
<211> 81
<212> DNA
<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Forward primer
for insertion of HPIV2 HN ORF into rB/HPIV3 genome

<400> 38
ggaaaggcgc gccaaagtaa gaaaaactta ggattaaagg cggatggaag attacagcaa 60
tctatctctt aaatcaattc c 81

<210> 39
<211> 54
<212> DNA
<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Reverse primer
for insertion of HPIV2 HN ORF into rB/HPIV3 genome

<400> 39
ggaaaggcgc gccaaaatta aagcattagt tcccttaaaa atggtattat ttgg 54

<210> 40
<211> 25
<212> DNA
<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Primer for
construction of PIV3-2 chimeric cDNAs, PIV2 F
(sense)

<400> 40
gtaccatgga tcacctgcat ccaat 25

<210> 41
<211> 31
<212> DNA
<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Primer for

construction of PIV3-2 chimeric cDNAs, PIV2 F
(antisense)

<400> 41
tgtggatcct aagatatccc atatatgttt c 31

<210> 42
<211> 20
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Primer for
construction of PIV3-2 chimeric cDNAs, PIV2 F
(sense)

<400> 42
atgcatcacc tgcattcaat 20

<210> 43
<211> 22
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Primer for
construction of PIV3-2 chimeric cDNAs, PIV2
(antisense)

<400> 43
tagtgaataa agtgtcttgg ct 22

<210> 44
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Primer for
construction of PIV3-2 chimeric cDNAs, PIV2 HN
(sense)

<400> 44
catgagataa ttcattcttga tggt 24

<210> 45
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Primer for
construction of PIV3-2 chimeric cDNAs, PIV2 HN
(antisense)

<400> 45
agcttaaagc attagttccc ttaa

24

<210> 46
<211> 28
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Primer for
construction of PIV3-2 chimeric cDNAs, PIV3 F
(sense)

<400> 46
atcataatta ttttgataat gatcatta

28

<210> 47
<211> 19
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Primer for
construction of PIV3-2 chimeric cDNAs, PIV3 F
(antisense)

<400> 47
gttcagtgc tgttgtgtt

19

<210> 48
<211> 27
<212> DNA
<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Primer for
construction of PIV3-2 chimeric cDNAs, PIV3 HN
(sense/antisense)

<400> 48

tcataattaa ccataatatg catcaat

27

<210> 49

<211> 24

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Primer for
construction of PIV3-2 chimeric cDNAs, PIV3 HN
(sense)

<400> 49

gatggaatta attagcacta tgat

24

<210> 50

<211> 20

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Primer for
construction of PIV3-2 chimeric cDNAs, PIV2 F
(antisense)

<400> 50

atgcatcacc tgcattcaat

20

<210> 51

<211> 19

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Primer for
construction of PIV3-2 chimeric cDNAs, PIV2 F
(sense)

<400> 51

gatgatgtag gcaatcagc

19

<210> 52

<211> 18

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Primer for
construction of PIV3-2 chimeric cDNAs, PIV2 HN
(sense)

<400> 52

actgccacaa ttcttggc

18

<210> 53

<211> 26

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Primer for
construction of PIV3-2 chimeric cDNAs, PIV2 HN
(antisense)

<400> 53

ttaaagcatt agttccctta aaaatg

26

<210> 54

<211> 23

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Primer for
construction of PIV3-2 chimeric cDNAs, PIV3 F
(sense)

<400> 54

aagtattaca gaattcaaaa gag

23

<210> 55

<211> 20

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Primer for construction of PIV3-2 chimeric cDNAs, PIV3 HN (antisense)

<400> 55

cttattagtg agcttggtgc

20

<210> 56

<211> 20

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Primer for construction of PIV3-2 chimeric cDNAs, PIV2 F (sense)

<400> 56

accgcagctg tagcaatagt

20

<210> 57

<211> 21

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Primer for construction of PIV3-2 chimeric cDNAs, PIV2 HN (antisense)

<400> 57

gattccatca cttaggtaaa t

21

<210> 58

<211> 22

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Primer for construction of PIV3-2 chimeric cDNAs, PIV3 M (sense)

<400> 58
gatactatcc taatattatt gc

22

<210> 59
<211> 20
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Primer for
construction of PIV3-2 chimeric cDNAs, PIV3 L
(antisense)

<400> 59
gctaattttg atagcacatt

20

<210> 60
<211> 15492
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Sequence of
pFLC.PIV32, 15492 bp in sense orientation

<400> 60
accaaacaag agaagaaact tgtctgggaa tataaattta acttttaaatt aacttaggat 60
taaagacatt gactagaagg tcaagaaaag ggaactctat aatttcaaaa atgttgagcc 120
tatttgatac atttaaatgca cgtaggcaag aaacataaac aaaatcagcc ggtggagcta 180
tcattcctgg acagaaaaat actgtctcta tattcgccct tggaccgaca ataactgatg 240
ataatgagaa aatgacatta gctcttctat ttctatctca ttcactagat aatgagaaac 300
aacatgcaca aagggcaggg ttcttggtgt ctttattgtc aatggcttat gccaatccag 360
agctctacct aacaacaaat ggaagtaatg cagatgtcaa gtatgtcata tacatgattg 420
agaaagatct aaaacggcaa aagtatggag gatttgtggt taagacgaga gagatgatat 480
atgaaaagac aactgattgg atatttgga gtgacctgga ttatgatcag gaaactatgt 540
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tctcaggggt aagaaaaggc tttttcacc gattggaagc tttcagacaa gatggaacag 720
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ttcaatatgc	ctgggcagaa	ggaaatagaa	gcgatgatca	gactgagcaa	gctacagaat	1500
ctgacaatat	caagaccgaa	caacaaaaca	tcagagacag	actaaacaag	agactcaacg	1560
acaagaagaa	acaaagcagt	caaccaccca	ctaataccac	aaacagaaca	aaccaggacg	1620
aaatagatga	tctgtttaac	gcatttggaa	gcaactaatc	gaatcaacat	tttaatatct	1680
atcaataata	aataagaaaa	acttaggatt	aaagaatcct	atcataccgg	aatatagggg	1740
ggtaaattta	gagtctgctt	gaaactcaat	caatagagag	ttgatggaaa	gcgatgctaa	1800
aaactatcaa	atcatggatt	cttggaaga	ggaatcaaga	gataaatcaa	ctaatatctc	1860
ctcggccctc	aacatcattg	aattcatact	cagcaccgac	ccccagaag	acttatcgga	1920
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tgttccaagc	gagatatcag	gaagtgatga	catatttaca	acagaacaaa	gtagaaacag	2340
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aacagaaata	cagacagaat	catcagaaac	acaatcctca	tcattggaatc	tcattcatcga	2700
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cgatgtacaa	gttaaatcag	agatattaag	ttcatacaat	gagtcaaatg	caacaagact	3420
aatacccaaa	aaagttagca	gtacaatgag	atcactagtt	gcagtcatca	acaacagcaa	3480
tctctcacia	agcacaaaac	aatcatacat	aaacgaactc	aaacgttgca	aaaatgatga	3540
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cattcccaga	atcatcattc	tctgaaaatg	gtcatataga	accattacca	ctcaaagtca	3840
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